

CLAIMS:

What is claimed is:

1. An electrical connector for mating with a complementary connecting device having a mating portion, comprising:
 - a shell having an internal cavity and a front opening for receiving the mating portion of the complementary connecting device inserted into the cavity;
 - 5 a housing mounted in at least a rear portion of the shell and having a mating portion extending forwardly into the cavity; and
 - a shutter slidably mounted in the internal cavity of the shell and formed with a passage for receiving the forwardly extending mating portion of the housing therethrough, whereby when the mating portion of the complementary connecting device is inserted into the cavity through
10 the front opening in the shell, the shutter is slidably pushed rearwardly from a forward position to a rear position whereat the mating portion of the housing passes through the passage in the shutter for engaging the mating portion of the complementary connecting device.
2. The electrical connector of claim 1, including spring means for biasing the shutter toward its forward position.
3. The electrical connector of claim 2 wherein said spring means comprises a coil spring extending in a direction between the housing and the front opening in the shell.
4. The electrical connector of claim 3 wherein said shutter is elongated, and including a pair of said coil springs at opposite ends of the shutter.
5. The electrical connector of claim 3 wherein the shell and the coil spring are of metal material and said housing includes a through hole through which a rear end of the coil spring extends into engagement with a portion of the shell.
6. The electrical connector of claim 3 wherein said shutter includes a rearwardly extending post projecting into a front end of the coil spring.

7. The electrical connector of claim 1, including front-to-rear interengaging guide means between the shell and the shutter.

8. The electrical connector of claim 7 wherein said guide means comprise a guide slot in the shell receiving a guide boss on the shutter.

9. An electrical connector for mating with a complementary connecting device having a mating portion, comprising:

5 means defining a receptacle having a front opening for receiving the mating portion of the complementary connecting device inserted into the receptacle, and a connector mating portion extending forwardly into the receptacle for interconnection with the mating portion of the complementary connecting device; and

10 a shutter for closing the front opening of the receptacle and slidably mounted in the receptacle for movement from a forward closing position to a rear position, the shutter having a passage for receiving the forwardly extending connector mating portion, whereby when the mating portion of the complementary connecting device is inserted into the receptacle through the front opening thereof, the shutter is slidably pushed rearwardly from its forward position to its rear position whereat the connector mating portion passes through the passage in the shutter for engaging the mating portion of the complementary connecting device.

10. The electrical connector of claim 9, including spring means for biasing the shutter toward its forward position.

11. The electrical connector of claim 10 wherein said spring means comprises a coil spring.

12. The electrical connector of claim 10 wherein said shutter is elongated, and including a pair of said coil springs at opposite ends of the shutter.

13. The electrical connector of claim 10 wherein said shutter includes a rearwardly extending post projecting into a front end of the coil spring.

14. An electrical connector for mating with a complementary connecting device having a mating portion, the connector being adapted for mounting on a printed circuit board, comprising:

5 a metal shell having an internal cavity and a front opening for receiving the mating portion of the complementary connecting device inserted into the cavity, the shell having a grounding portion for connection to the printed circuit board;

a housing mounted in at least a rear portion of the shell and having a through hole;

a shutter slidably mounted in the internal cavity of the shell for movement between a forward position substantially closing the front opening of the cavity and a rear position; and

10 a metal spring for biasing the shutter toward its forward position, the metal spring extending through the through hole in the housing and into engagement with the metal shell.

15. The electrical connector of claim 14 wherein said spring is a coil spring extending in a front-to-rear direction, with a rear end of the coil spring extending through the through hole in the housing and into engagement with a rear portion of the metal shell.

AMENDED CLAIMS

[received by the International Bureau on 14 January 2005 (14.01.2005);
original claims 1-8, 14, 15 amended, 9-13 canceled (03 pages)]

1. An electrical connector (30) for mating with a complementary connecting device (12) having a mating portion (12b), comprising:

a shell (34) having an internal cavity (40), a front opening (40a) for receiving the mating portion of the complementary connecting device inserted into the cavity;

a housing (32) mounted in at least a rear portion of the shell and having a mating portion (68) extending forwardly into the cavity, and a plurality of stopper tabs (48) bent downwardly from a top front edge of a top wall (34a); and

a shutter (36) slidably mounted in the internal cavity of the shell and formed with a passage (58) for receiving the forwardly extending mating portion of the housing therethrough, whereby when the mating portion (12b) of the complementary connecting device (12) is inserted into the cavity (40) through the front opening in the shell, the shutter (36) is slidably pushed rearwardly from a forward position to a rear position whereat the mating portion (68) of the housing (32) passes through the passage (58) in the shutter for engaging the mating portion of the complementary connecting device.

2. The electrical connector of claim 1, including spring means (38) for biasing the shutter (36) toward its forward position.

3. The electrical connector of claim 2 wherein said spring means comprises a coil spring (38) extending in a direction (B) between the housing (32) and the front opening in the shell (34).

4. The electrical connector of claim 3 wherein said shutter (36) is elongated, and including a pair of said coil springs (38) at opposite ends of the shutter and a plurality of stopper notches (62) formed in a top front edge of the shutter for receiving stopper tabs (48) of shell (34).

5. The electrical connector of claim 3 wherein the shell (34) and the coil spring (38) are of metal material and said housing (32) includes a through hole (66) through which a rear end of the coil spring extends into engagement with a portion

(56) of the shell.

6. The electrical connector of claim 3 wherein said shutter (36) includes a rearwardly extending post (60) projecting into a front end of the coil spring (38).

7. The electrical connector of claim 1, including front -to-rear interengaging guide means (50,65) between the shell (34) and the shutter (36).

8. The electrical connector of claim 7 wherein said guide means comprise a guide slot (50) in the shell (34) receiving a guide boss (65) on the shutter (36).

14. An electrical connector (30) for mating with a complementary connecting device (12) having a mating portion (12b), the connector being adapted for mounting on a printed circuit board, comprising:

a metal shell (34) having an internal cavity (40), a front opening (40a) for receiving the mating portion of the complementary connecting device inserted into the cavity, and a plurality of stopper tabs (48) bent downwardly from a top front edge of a top wall (34a), the shell having a grounding portion (46) for connection to the printed circuit board;

a housing (32) mounted in at least a rear portion of the shell and having a through hole (66);

a shutter (36) slidably mounted in the internal cavity of the shell for movement between a forward position substantially closing the front opening of the cavity and a rear position, the shutter including a plurality of stopper notches (62) formed in the top front edge of the shutter for receiving stopper tabs (48) of shell (34) when the shutter is in the forward position; and

a metal spring (38) for biasing the shutter toward its forward position, the metal spring extending through the through hole (66) in the housing and into engagement with the metal shell.

15. The electrical connector of claim 14 wherein said spring is a coil spring (38) extending in a front-to-rear direction, with a rear end of the coil spring

extending through the through hole (66) in the housing (32) and into engagement with a rear portion (56) of the metal shell (34).